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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/887,038	06/25/2001	Aaron Kaplan	01/22171	8332

7590 09/09/2003

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EXAMINER	
KUBELIK, ANNE R	
ART UNIT	PAPER NUMBER
1638	

DATE MAILED: 09/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Advisory Action	Application No.	Applicant(s)	
	09/887,038	KAPLAN ET AL.	
	Examiner	Art Unit	
	Anne R. Kubelik	1638	

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 13 August 2003 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE. Therefore, further action by the applicant is required to avoid abandonment of this application. A proper reply to a final rejection under 37 CFR 1.113 may only be either: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114.

PERIOD FOR REPLY [check either a) or b)]

a) ☒ The period for reply expires 2 months from the mailing date of the final rejection.

b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection. ONLY CHECK THIS BOX WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

1. ☐ A Notice of Appeal was filed on _____. Appellant's Brief must be filed within the period set forth in 37 CFR 1.192(a), or any extension thereof (37 CFR 1.191(d)), to avoid dismissal of the appeal.

2. ☒ The proposed amendment(s) will not be entered because:

   (a) ☒ they raise new issues that would require further consideration and/or search (see NOTE below);

   (b) ☐ they raise the issue of new matter (see Note below);

   (c) ☐ they are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or

   (d) ☐ they present additional claims without canceling a corresponding number of finally rejected claims.

   NOTE: *See Continuation Sheet.*

3. ☒ Applicant's reply has overcome the following rejection(s): See Continuation Sheet.

4. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).

5. ☒ The a)☐ affidavit, b)☒ exhibit, or c)☒ request for reconsideration has been considered but does NOT place the application in condition for allowance because: *See Continuation Sheet.*

6. ☐ The affidavit or exhibit will NOT be considered because it is not directed SOLELY to issues which were newly raised by the Examiner in the final rejection.

7. ☒ For purposes of Appeal, the proposed amendment(s) a)☒ will not be entered or b)☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.

   The status of the claim(s) is (or will be) as follows:

   Claim(s) allowed: _____.

   Claim(s) objected to: _____.

   Claim(s) rejected: *1-4, 6, 8-11, 13-16, 19-23 and 26-30*.

   Claim(s) withdrawn from consideration: _____.

8. ☒ The proposed drawing correction filed on *13 August 2003* is a)☒ approved or b)☐ disapproved by the Examiner.

9. ☐ Note the attached Information Disclosure Statement(s)(PTO-1449) Paper No(s). _____.

10. ☐ Other: _____

Continuation of 2. NOTE:
New issues:
112, 2nd:
Claims 1 and 16, part (a), are indefinite in their recitation of "95% homologous". It is unclear what this means - are only identical amino acids included or are ones with some degree of similarity also included - and if so how similar?

Continuation of 3. Applicant's reply WOULD HAVE overcome the following rejection(s):
Objection to claim 3 for a misspelling.
112, 1st, new matter over claims 1-4, 6-11, 13-16, 19-23 and 26-30
112, 2nd, over claims 1-4, 6, 8-11, 13-16, 19-23 and 26-30 from prior Office action
102(b) over claims 1-4, 8-9, 13-16, 20-23, 26-27 and 30 as being anticipated by Ko et al
103 over claims 1-4, 8-11, 13-16, 20-23 and 26-30 over Ko et al in view of Gordon-Kamm et al

Continuation of 5. does NOT place the application in condition for allowance because:
112, 1st, scope of enablement over claims 1-4, 6-11, 13-16, 19-23 and 26-30:
Applicant restates material in the Declaration (response pg 9-13). This material is addressed below.

Declaration of Prof Aaron Kaplan:

Prof Kaplan urges that it is well-established that the ability to concentrate CO2 against the gradient is caused by at least 4 different protein systems, citing Shibata et al, 2002, and Shibata et al, 2001 and Ogata et al, in press. These include 2 CO2 uptake systems and two HCO transporter systems, cmpA-D and sbtA, and studies indicate the limited role of the cmpA-D system in cyanobacteria (Dec pg 2-3). This is not found persuasive. Shibata et al, 2002 states that "the role of SLR151(IctB) in intracellular HCO3 accumulation in cyanobacteria is not known" and suspect that ictB acts downstream of the 2 CO2 uptake systems and two HCO transporter systems (pg 14, paragraph 1). Ogawa et al states "It was earlier proposed that IctB is involved in HCO3 uptake in Synechococcus 7942 suggesting that its homologue, Slr1515, may have a similar function in Synechococcus 6803... However, lack of HCO3 uptake in the ... mutant ... did not lend support to this possibility" (pg 5, left column, paragraph 2). Thus, eithersIr1515 and IctB are not homologues, calling into questio Applicant's ability to idientfy ictB homologs, or IctB is not a bicarbonate transporter. Furthermore, IctB is not listed as one of the Ci acquisition systems in Figure 3. Therefore, the papers sent by Applicant do not support Applicant's assertions. Shibata et al, 2001 could not be considered because it was not sent.

Prof Kaplan urges that in a unpublished study, a Synechocystis PCC 6803 mutant in which the two CO2 uptake systems and the cmpA-D and sbtA systems were inactivated, was reactivated by salinity because the ictB system was reactivated, demonstrating the evidence for the role of ictB in HCO uptake and presence of multiple pathways for C acquisition (Dec pg 3). This is not found persuasive. This data does not appear to have been sent, and thus could not evaluated.

Prof Kaplan urges that it is his strong opinion that the bicarbonate transporter acivity of ICTB is amply demonstarted in the specification; an ictB mutant was severely depressed in Ci uptake, especially in low CO2 concentration and plants transformed with the ictB gene had a higher photosynthetic rate. Figure 12 in the declaration showed that these plants had increased inorganic carbon fixation Lieman-Hurwitz et al provide further evidence for a higher CO2 concentration at the site of Rubisco in these plants (Dec pg 3-4). This is not found persuasive. Lieman-Hurwitz et al states that "the role of ictB in Ci uptake in cyanobacteria is not yet understood" (pg 47, left column, paragraph 2). Lieman-Hurwitz et al does not provide support for ictB being a bicarbonate transporter. Furhter, if IctB encodes a protein downstream of the actual transporter proteins, as suggested by Shibata et al, 2002, it would not be surprising that plants in which ictB was mutant to be severely depressed in Ci uptake.

Prof Kaplan urges that it is his strong opinion that the ictB protein has bicarbonate transporter activity. He has identified a number of highly conserved peptide domains that are characteristic of the ictB protein and its homologues from other species, aligned in Fig 11 of the declaration. Further the ictB protein from 7942 and the homologous protein from strain WH 8102 have characteristic hydrophobic and hydrophilic domains (Dec pg 4-5). This is not found persuasive. Many or most of the proteins in Figure 11 were publically available only after the filing date of the instant application (see GenBank NP683039, NP489113, and ZP 00106942, for example); further these sequences are not taught by the instant specification. See In re Glass, 181 USPQ 31, 34 (CCPA 1974), which teaches that references published after the filing date of an application may not be relied upon for enablement of the specification. Examiner could not find the sequence from WH 8102 in GenBank, and Applicant did not provide the date the sequence was publically available. The proteins in the enclosed BLAST search includes chlorophyll a/b binding proteins, PSII proteins, and light harvesting proteins, not bicarbonate transporters; the query sequence is not identified, but if it is SEQ ID NO3, the search does not provide support for SEQ ID NO:3 being a bicarbonate transporter.

112, 1st, written description over claims 1-4, 6-11, 13-16, 19-23 and 26-30: Applicant did not address this rejection separately. However,as the identity of ictB (SEQ ID NO:3) as a bicarbonate transporter remains in question, as discussed above, written description is lacking for nucleic acids encoding proteins that have 95% idenity to SEQ ID NO:3 and that encode bicarbonate transporters.

ARK

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